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POLICY RESEARCH WORKING PAPER 1411

Income Inequality, Welfare, and Poverty

An Illustration Using Ukrainian Data

Nanak Kakwani

The standard of living in Ukraine increased significantly in the 1980s, and income inequality declined. But in 1991–92 income inequality and poverty increased again, partly because government benefits went more to richer families than to those in need.

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Summary findings

Ukraine is now faced with economic crisis on an unprecedented scale. The government has to follow rigorous demand management policies, which entail lowering the population's standard of living. To design policies that protect the poorest and most vulnerable groups in the society, it is important to understand the nature of poverty and income inequality.

Kakwani addresses the following questions: What is the extent of income inequality and is it increasing? How can observed changes in inequality be explained? Is the burden of income tax evenly distributed across the population?

The Ukrainian data base is far from satisfactory, so Kakwani's findings are only tentative. Among them:

- The standard of living increased significantly in the late 1980s, then fell in the 1990s. Real per capita family income grew by an average 7 percent in 1989–90, then fell about 24 percent in 1991–92. Per capita income for families dependent on government transfers fell by more than one-half.
- Income inequality declined in the 1980s, to rise again in 1991–92. In particular, the family incomes of state and collective farm workers — relative to industrial workers — improved between 1980 and 1991. The increase in inequality that occurred in 1991–92 came about, among other reasons, because government benefits tended to be redistributed to richer families, not those in need.

Poverty in Ukraine declined over the period 1980–91, from 38 percent of the population to 9 percent. But in 1992, 30 percent of the population was poor again, an alarming increase attributable both to a decline in real per capita income and an increase in income inequality. Still, income inequality was lower in Ukraine than in most other former republics of the Soviet Union.

This paper — a product of the Transition Economics Division, Policy Research Department — is part of a research project on income distribution and poverty during transition. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Grace Evans, room N11-041, extension 85783 (54 pages). January 1995.

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POLICY RESEARCH DEPARTMENT
WORLD BANK

RESEARCH PROJECT
INCOME DISTRIBUTION DURING THE TRANSITION

INCOME INEQUALITY, WELFARE AND POVERTY: AN ILLUSTRATION USING UKRAINIAN DATA

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This paper is a product of a research project on social expenditures in Eastern Europe undertaken by the Socialist Economies Reform Unit under the direction of Branko Milanovic. These papers carry the name of the authors and are preliminary versions for discussion only. The findings, interpretations, and conclusions are the author's own. They should not be attributed to the World Bank, its Board of Directors, its management, or any of its member countries. Comments and suggestions are welcome. Phone (202) 473-6968, Fax (202) 522-1151

Contents

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Tables

1. Introduction

Ukraine with a population of 52 million people is the second largest country of the Former Soviet Union. It is well endowed with fertile land and rich mineral resources. Huge coal and iron deposits have led to considerable industrial development especially in heavy industry. Ukraine was once known as the bread basket of the Russian Empire and later of the Soviet Union.

With such wealth and a highly educated labour force, Ukraine has the potential to become a rich country. Unfortunately, it is now faced with economic crisis, the severity of which is on an unprecedented scale. Output has been falling continuously since 1990. According to a recent World Bank (1993) report, Ukraine's real net material product (NMP) registered declines of 3 percent and 11 percent, respectively in 1990 and 1991 and is estimated to have contracted by another 15 percent in 1992. The country is faced with hyperinflation. The Ukrainian currency is depreciating at a phenomenal rate. The financial conditions of its enterprises have deteriorated badly.

Faced with such crisis, it is hard for any government to secure a smooth transition from a centrally planned to a market-oriented economy. To provide a stable macroeconomic environment, the government of Ukraine will need to follow rigorous demand management policies. This entails lowering the standard of living of the population. Under these circumstances, it is important that the government design policies which protect the poorest and most vulnerable groups of society.

Ukraine has very extensive social protection programs inherited from Soviet times. The current levels of government benefits seem unsustainable in the long run and the overall system will undoubtedly have to undergo an overhaul. Spending on social programs, including subsidies and pensions was estimated to be 44 percent of GDP in 1992 (World Bank 1993). The shrinking tax base due to recession and a much needed contraction in the fiscal deficit would necessitate a substantial reduction in welfare expenditures together with a change in their composition. It is, therefore, important to adopt the most efficient ways of directing expenditures towards various population subgroups. Obviously, the most efficient policy will be to target expenditures to the poorest section of the population. To design such policies, it is important to understand the nature of poverty and income distribution. This study attempts to do exactly this for Ukraine for the first time.

The study is concerned with such questions as: What is the extent of the inequality of income and in which way direction is it moving? How can the observed changes in inequality be explained? Is the burden of tax evenly distributed across the population? How do the various income and expenditure components affect total welfare? What are the effects of current government programs on total welfare? This study also attempts to measure the aggregate level of poverty in Ukraine and the extent to which it is affected by economic growth and income redistribution.

Quality of data, however, is a serious limitation that must be kep in mind. Ukraine is still using the sampling procedure inherited from the old Soviet system. It has a number of flaws, the most important of which, for our study are: the concentration on the "average" types of housegolds with a consequent underrepresentation of the poorer and richer segments of the population; bias toward the employed vs. pensioners, students and other non-active members; and underreporting of "unofficial" sources of income.

The paper is organized as follows:

Section 2 discusses briefly the welfare and inequality measures used in the study. Section 3 develops techniques intended to analyze total welfare (and inequality) in terms of individual income and expenditure components. The welfare elasticities derived in this section provide a *link between total welfare and income or expenditure components. Section 4 offers a brief discussion of numerous methodological problems that arise in the measurement of economic welfare and inequality in Ukraine. Trends in real per capita income in Ukraine are discussed in Section 5 while Section 6 deals with trends in wages and salaries in Ukraine. Trends in inequality and welfare are analyzed in Sections 7 and 8, respectively. Section 9 is focussed on poverty in Ukraine and Section 10 provides a comparison of welfare and poverty in Ukraine with other Soviet republics. Finally, Section 11 is devoted to some concluding remarks.

2. Welfare and Inequality Measures Used

Among several measures of economic welfare available to economists, per capita national income is widely used. Although providing a comprehensive picture of the country's productive capacity the aggregate income measure has been subject to much criticism. National income as conventionally measured excludes many factors that contribute to economic welfare while incorporating other factors which have an adverse effect on welfare.

Since our concern is always with the welfare levels of individuals, it is reasonable to derive aggregate welfare from individual incomes. One such measure is the average per capita income of all individuals in a particular society. The main drawback of this measure is that it does not take into account the inequality of income which always exists among individuals. This measure needs to be modified to make it sensitive to inequality in the distribution of income.

Several inequality measures have been proposed in the literature. Among them, the Lorenz curve is widely used. It is defined as the relationship between the cumulative proportion of individuals and cumulative proportion of income received when individuals are arranged in ascending order of their income. The curve is represented by a function L(p) which is interpreted as the fraction of total income received by the lowest pth fraction of income units. If the Lorenz curve for one distribution X lies everywhere above that for another distribution Y, then the distribution X may be said to be more equal than the distribution Y. However, the ranking provided by the curve is only partial - when two Lorenz curves interest, neither distribution can be said to be more equal than the other.

Despite the fact that the Lorenz curve provides only a partial ranking of the distributions, it is a powerful device for judging the distributions from the welfare point of view. Since the Lorenz curve ranking assumes that the distributions have the same mean income, it can only be used to compare inequality in the distributions. If the distributions have different means which is usually the case, the Lorenz curve may fail to provide a welfare ranking of the distributions.

Working independently on extensions of the Lorenz ordering Shorrocks (1983) and Kakwani (1984) arrived at a criterion which would rank any two distributions with different mean incomes. The new criterion given by $L(\mu,p)$ may be called the generalized Lorenz curve and is the product of the mean income μ and the Lorenz curve $L(p)$. This criterion of ranking has been justified from the welfare point of view in terms of several alternative classes of social welfare functions. Thus, it can be said that if the generalized Lorenz curve for distribution X lies everywhere above the generalized Lorenz curve for another distribution Y, then distribution X is welfare superior to distribution Y. The Lorenz curve and the generalized Lorenz curve will be extensively used in the present study to analyze the distribution of income in Ukraine.

Like the Lorenz curve, the generalized Lorenz curve also provides a partial ranking of distributions. When the two generalized Lorenz curves interest, then neither distribution could be said to be welfare superior to the other.

To arrive at a complete welfare ranking of distributions, we must use a single measure of welfare. Such a measure can be derived by giving different weights to individuals with different incomes. Suppose in a society there are n individuals who are arranged in ascending order of their incomes: $x_1 \leq x_2 \leq \ldots \leq x_n$, then a welfare measure may be defined as a unique function of $x_1, x_2, \ldots, x_n$. Sen (1974) considered the following welfare function

$$W = \sum_{i=1}^{n} x_i v_i$$

where v_i is the weight given to the person with income x_i. It is obvious that if $v_i = \frac{1}{n}$ for all i, then W is equal to average income of individuals. To make W sensitive to inequality in the distribution, we must give higher (lower) weight to individuals with lower (higher) incomes. Sen (1974) proposed that v_i (the weight given to the income of the ith person) should be proportional to the number of persons who are at least as well off as i.[1] From this proposition, Sen arrived at the welfare function:

$$W = \mu(1 - G) \qquad (1)$$

where μ is the mean income of the society and G is the Gini index which is a well-known

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1 Kakwani (1980) has proposed an alternative weighting scheme in which v_i is proportional to the total income of persons who are at least as well off as individual i.

measure of income inequality. The Gini index is equal to one minus twice the area under the Lorenz curve.

Although there exist several alternative welfare measures[2], this study is confined to using W as a basis for analyzing welfare in Ukraine. We give two reasons for this choice. First, we regard W to be a reasonable welfare measure which takes into account both the size and distribution of income. Second, since income distribution data are available only in grouped form, W is the only welfare function which can be estimated most accurately from such data.

3. Welfare by Income Components

Since the individual income is the sum of several income components, it will be useful to analyze total welfare (and inequality) in terms of individual income components. The methodology for disaggregation of Gini index by income components was first developed by Rao (1969) and subsequently refined by Kakwani (1977, 1980), Field and Fei (1974), Fei, Ranis and Kao (1978), Fields (1979) and Pyatt, Chen and Fei (1980). In this section we extend this methodology to analyze the contribution of each income component to total welfare.

Suppose there are k income components and μ_j is the mean of the jth component. Then it is obvious that

$$W = \sum_{j=1}^{k} \mu_j(1-C_j) \tag{2}$$

and the disaggregation of Gini index in terms of income components is written as (Kakwani 1980):

$$G = \frac{1}{\mu}\sum_{j=1}^{k} \mu_j C_j \tag{3}$$

where C_j is called the concentration index of the jth income component. The concentration index C_j is similar to the Gini index except that the ranking of individuals is by the total income and not the jth income component. As a result, the index can be negative.

The concentration index of an income component measures how evenly or unevenly that income component is distributed over the total individual income. If C_j is greater (smaller) than G, it implies that the jth income component is distributed over the total income in favor of richer (poorer) individuals.

Combining (1) with (2) and (3) gives

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2 See for instance Atkinson (1970) who derived a class of welfare measures based on a homothetic utility function.

$$W = \sum_{j=1}^{k} \mu_j(1-C_j) \tag{4}$$

which shows how the total welfare can be decomposed in terms of individual income components; $\mu_j(1 - C_j)$ being the contribution of the jth income component to the total welfare.

To see how the change in the jth income component affects the total welfare, we compute the elasticity of W with respect to μ_j:

$$\eta_j = \frac{\mu_j(1-C_j)}{\mu(1-G)} \tag{5}$$

which implies that if μ_j increases by 1 per cent; then the total welfare increases by η_j per cent.

It is instructive to write (5) as

$$\eta_j = \frac{\mu_j}{\mu} + \frac{\mu_j(G-C_j)}{\mu(1-G)} , \tag{6}$$

in which the first term may be called the income effect and the second term, the inequality effect. The inequality effect measures the gain or loss in welfare as a result of income redistribution. If the increase in the jth income component favors the poor more than the rich, the inequality component will be positive, otherwise it will be negative. This leads us to define a new progressivity index of the jth income component as the ratio of the inequality component to the income component:[3]

$$P_j = \frac{(G-C_j)}{(1-G)} , \tag{7}$$

A positive value of P_j implies the jth income component to be progressive and the negative value implies the jth component to be regressive. Thus, the magnitude of P_j indicates whether the increase in the jth income component favors the poor or the rich. If the jth income component is distributed in proportion to total income, C_j will be equal to G which gives P_j to be equal to zero. In this case, the effect of an increase in the jth income component favors neither the poor nor the rich.

P_j can be used to devise an optimum tax - expenditure policy. It provides a quantitative basis for maximizing the country's total welfare with minimum cost.

Next, we wish to evaluate the effect of price changes on the total welfare. So assume

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3 Note that η_j in (5) is the infinite elasticity; it is derived under the assumption that income source j increases infinitesimally across all income recipients, or in other words, it is assumed that increases in income sources do not change the ranking of recipients. This elasticity is similar to the elasticities of the Gini index with respect to income components derived by Lemman and and Yitzhaki (1985).

that there are k expenditure items whose prices are p_1, p_2,...,p_k and if q_1, q_2,...,q_k are the quantities consumed of the k expenditure items. then the total money income of an individual can be written as

$$x = \sum_{j=1}^{k} p_j q_j = \sum_{j=1}^{k} v_j \tag{8}$$

where $v_j = p_j q_j$ is the consumption expenditure on the jth commodity.

Let $x = e(\mathbf{p}, u)$ is the cost or expenditure function which is the minimum expenditure required by an individual to reach the utility level u at the price vector $\mathbf{p}$.[4] Suppose the prices have changed to $\mathbf{p}^*$. If the individual remained on the same level of welfare as before, the new expenditure of the individual will have to be

$$x^* = e(\mathbf{p}^*, u) \tag{9}$$

Thus, the individual should be given an additional income of $(x^* - x)$ in order that he remained at the same level of welfare as before. Suppose in the initial period the individual enjoyed a standard of living equivalent to x but because of changed in prices, the new standard of living of the individual will be given by

$$y = x - (x^* - x) = 2x - x^* \tag{10}$$

Applying Taylor's theorem on (9) gives

$$e(p^*, u) = e(p, u) + \sum_{j=1}^{k} \frac{dp_j}{p_j} v_j(x) \tag{11}$$

where $\frac{dp_j}{p_j}$ is the percentage change in the price of the jth commodity and use has been made of the result: $\frac{\partial e(p,u)}{\partial p} = q$ which the well-known Shephard's Lemma in demand theory (Deaton and Muellbauer (1980)).[5]

Substituting (11) into (10) gives

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4 Note that the expenditure function e(p,u) will be equal to the actual expenditure x if it is assumed that every individual maximizes his or her utility in every period which is the usual assumption made in the consumer theory.

[5]Note that the terms of higher order of smallness in (11) have been ignored.

$$y = x - \sum_{j=1}^{k} \frac{dp_j}{p_j} v_j(x) \tag{12}$$

Applying Theorem 8.5 of Kakwani (1980) on (12) gives

$$W^* = W - \sum_{j=1}^{k} \frac{dp_j}{p_j} m_j(1 - C_j) \tag{13}$$

where $W = \mu(1 - G)$ is the social welfare before the price change and W^* is the social welfare after the price change, m_j is the mean expenditure on the jth item and C_j is the concentration index of the jth item. Equation (13) immediately gives the price elasticity of the aggregate welfare as

$$\varepsilon_j = -\frac{m_j(1-C_j)}{\mu(1-G)} \tag{14}$$

which indicates that if the price of the jth commodity increases by 1 percent, then the aggregate welfare changes by ϵ_j percent. ϵ_j will always be negative. Thus, the magnitude of ϵ_j can be used to evaluate the effects of price changes on the aggregate welfare.

4. Methodological Problems

This section provides a brief discussion of many methodological problems which arise in the measurement of economic welfare and inequality in Ukraine.

Our study is based on the data obtained from the Family Budget Surveys (FBS), which had been carried out regularly in the Soviet Union since the 1950s. These surveys are the only source that provides income distribution data over time. But they have been subjected to severe criticisms (McAuley 1979, Shenfield 1983 and Atkinson and Micklewright 1992); the main among them is that the surveys are not representative of the population. The sample covered the territory of the former Soviet Union incompletely and unevenly (Cazes and Cacheux 1992). It is not known what proportion of families were sampled in Ukraine. The families in the sample were mainly selected on the basis of their industrial affiliation of wage earners. Consequently, social groups (such as students) which did not live in households with working members were excluded from the survey. The old age pensioners (originally excluded) have been included in the survey since 1977. The probability of a household being selected in the survey increased monotonically with the number of wage earners in the households. This will clearly bias the results on economic welfare and inequality.

In this paper we have used per capita household income as a measure of household economic welfare.[6] The income concept used is the personal income which includes [McAuley (1979, pp.9-12)] the following:

Money earnings from employment
(a) in the state sector (excluding holiday pay)
(b) in collective farms.

Transfer payments
(a) pensions
(b) other social security payments
(c) stipends.

Receipts from the financial system
(a) interest from saving deposits
(b) lottery prizes

Other receipts
(a) the value of agricultural production for own consumption
(b) receipts in kind from collective farms
(c) other income from private economic activity.

The consumption of home-grown products is evaluated at state prices. In the case of many products, especially meat and fruit, this may understate the true value of the product to the household. The imputed rent of owner-occupied housing is not included. Since rents charged by the state are very low, the distortionary effect of this omission should not be too great.

When the index of household welfare is constructed, the next step is to determine the welfare of the individuals in the households. In this paper individual welfare was derived by assigning every individual in a household a value equal to the per capita income for that household (Kakwani 1986). If there are severe intrahousehold inequities in the distribution of food and non-food items, poverty and inequality will both be underestimated. This problem could not be corrected because of non-availability of information concerning the intra-household distribution of resources. But intrahousehold inequality may not be bad in Ukraine. Ukrainians

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[6]A better measure of household welfare will of course be the per equivalent adult income which corrects for the differing needs of adults and children. But this measure could not be employed because the FBS data were available only in grouped form (the groups formed on the basis of per capita household expenditure). We could have remedied this only by assuming that the ranking of households by per capita income is the same as that by income per equivalent adult. This assumption which is unlikely to hold will result in more serious estimation errors.

are more family orientated than West-Europeans so they tend to look after their children and aged parents better than in Anglo-Saxon societies. However, because of male dominated society, women tend to perform more domestic work than in Western societies which may contribute to inequality in welfare within households. This aspect of welfare is not the focus of the present paper.

Taxes, fees and fines paid by individuals are not subtracted from personal income. This may lead to an over-estimation of economic welfare. Since data on the amount of taxes, fees and fines paid by individuals are available, an attempt is made to quantify their effect on the total individual welfare in Section 6.

To compare welfare and poverty across different time periods, one needs to adjust the distributions given in current prices for price changes over time. We used the official price indices for Ukraine as presented in Table 1. The only official price index available until 1990 is the retail price index. This index has severe limitations, the main among them being that it is constructed on the basis of official list prices in the state retail outlets. It ignores the prices charged in collective farm markets and other secondary markets. A new price index called consumer price index (CPI) was introduced in January 1991. This is a superior index based on a wide range of prices actually charged.

As can be seen from Table 1, prices in Ukraine have been increasing at a phenomenal rate since January 1992. It seems the country is on the brink of hyperinflation. The government has lost control over the budget. The currency has been depreciating at an accelerating rate. This clearly has severe implications for the standard of living. If wages lag behind price inflation, the standard of living for a large majority of people will certainly decline.

Measurement of economic welfare is problematic under the unstable situation of hyperinflation. Relative prices will be changing constantly resulting in severe distortions.

Since in the Family Budget Surveys, households are not interviewed at the same time, so if there is a high rate of inflation, the distribution of nominal household income which these surveys provide will differ from that of real household income. Needless to say, it is the real income of households that is relevant for the purpose of analyzing the inequality of income. Kakwani (1987) has demonstrated that the inequality of nominal income from these surveys tends to overestimate the inequality of real household income (income adjusted for inflation occurring during the survey period).

The FBS data are available in grouped form giving only the percentage of people in each group. This may be supplemented by information on overall mean income. The mean income of each income range were not available. Estimates of inequality from such data will clearly be biased because of loss of information due to grouping. Clearly, if the number of groups is small, the bias in estimates can be quite large. To estimate inequality from such data, one needs to employ some interpolation device. A commonly used procedure is to fit a density function to the entire income range and then compute inequality measures from the parameters of the fitted function. The difficulty with this approach is that there exists no single function which fits the entire income range.

Table 1 Price Indices in Ukraine

Year or Month	Overall Index	Food	Clothing and Footwear	Rent, Water, Fuel and Power	Household Goods	Medical Care	Transport and Comm	Recreation Education Culture	Personal Care and Effects
	Retail Price Index from 1980 to 1990 and Consumer Price Index 1991 and 1992								
1980	100	-	-	-	-	-	-	-	-
1985	104	-	-	-	-	-	-	-	-
1986	106	-	-	-	-	-	-	-	-
1987	107	-	-	-	-	-	-	-	-
1988	107	-	-	-	-	-	-	-	-
1989	109	-	-	-	-	-	-	-	-
1990	114	-	-	-	-	-	-	-	-
1991	213.6	-	-	-	-	-	-	-	-
1992	3232.5	-	-	-	-	-	-	-	-
	Consumer Price Indices October 1990 = 100								
Dec 1990	100	100	100	100	100	100	100	100	100
Jan 91	103.7	101.9	105.7	100.5	104.5	100.2	100.9	109.1	106.1
Feb	108.6	103.3	115.2	101.6	119.4	100	101.7	119.9	113.4
March	117.7	109	121.3	123.7	157.8	99.8	103.4	133	131.8
April	195.9	199	225.4	150.9	229.8	100.3	173.4	155.9	186.8
May	198.3	194.2	236.2	153.5	249.3	99.1	176.5	162	203.6
June	199.9	191.9	241.4	161.6	259.8	100.3	177.2	167.2	206.2
July	200.9	190	243.8	162.4	267.6	101.3	180.2	171.5	207.6
Aug	201.5	186.2	250.9	166.3	275.4	102.3	180.4	174.1	198.9

Table 1 *(continued)*

Sep	206.5	188.4	259.2	167.3	284.5	108	184	178.1	213.4
Oct	219.5	197.1	283	170.6	305.8	115.7	186.4	192.9	239.9
Nov	235.7	209.1	310.5	175.2	341	132.2	188.3	209.3	244.7
Dec 91	260.9	228.1	354	188.3	373.4	132.3	192.1	243	262.8
Jan 92	919.4	927.5	966.4	773.7	1411.1	359.5	594	895.7	646.8
Feb	1129	994.3	1256.3	1755.5	1920.5	401.2	696.2	1223.5	730.9
March	1246.4	1086.8	1398.3	1895.9	2225.9	483	914.1	1290.8	896.1
April	1417.2	1211.8	1542.3	2057.1	2337.2	487.8	1038.4	1774.9	1187.3
May	1740.3	1379	1648.7	2275.2	2687.8	533.7	1694.7	3187.7	1269.2
June	2001.3	1795.5	1813.6	2341.2	2870.6	666.1	2060.8	3593	1387.2
July	2551.7	2449.1	2111	3834.9	3269.6	780.7	2388.5	4249.4	1789.5
Aug	2947.2	2838.5	2377	4291.3	3890.8	773.7	2744.4	5056.8	1970.2
Sep	3386.3	3233.1	2728.8	4960.7	4264.3	864.2	3356.4	5936.7	2179
Oct	4246.4	4041.4	3574.7	5119.4	5262.1	1292	5843.5	6756	2834.9
Nov	5206.1	4954.8	4557.7	5308.8	6525	1357.9	8397.1	7681.6	2922.8
Dec 92	7246.9	6426.4	6193.9	6503.3	9924.5	1447.5	14812.5	10001.4	3866.9
Jan 1993	14298.1	15693.3	10009.3	18540.9	16851.8	3219.2	24529.5	11781.6	8511
Feb	18344.5	18706.4	14093.1	24066.1	23457.7	4548.7	32894.1	16553.1	12630.3
March	22105.1	20951.2	18039.2	27363.2	32254.3	6172.6	41808.4	21370.1	17076.2
April 93	26238.8	24324.3	21611	31495	36898.9	7505.9	53389.3	26114.3	18903.4

In the present paper we have used a general interpolation device proposed by Kakwani (1980). This method utilizes, within each income range, a separate continuously differentiable function which exactly fits to the data points. The inequality and poverty measures are then computed by linking this function. Kakwani's approach requires information on the mean incomes in each income range which is not available in the present case. A modification of the approach is used in this paper.

5. Trends in Real Per Capita Income in Ukraine

Tables 2, 3 and 4 present information on the real per capita income in Ukraine based on data from the family budget surveys. The nominal incomes were converted to the real incomes by means of the price indices given in Table 1. The real per capita incomes given in the tables are at 1980 prices.

Table 4 giving the growth rates of per capita real income shows that the average standard of living in Ukraine increased quite significantly in the late 80s. The 1989-90 period registered a growth rate of 7.4 per cent, but this was eroded in the subsequent periods from 1990 to 1992. In 1990-91, the real value of salary income declined by 7.54 percent and that of collective farm income went down by a massive 30.67 percent. It is interesting to note that government cash benefits to families increased by 45.79 percent. Since government cash benefits are generally concentrated among poorer families, it is to be expected that the distribution of per capita family income would have become more equal during the 1990-91 period.

Per capita family income declined by 23.56 percent during the 1991-92 period. This represents a drastic reduction in the average standard of living of the Ukrainian people. Salary income declined by a massive 31.44 percent. Families dependent largely on government transfers suffered the greatest decline in their incomes.[7] Their per capita income fell by 58.33 percent. The substantial income gain made by transfer recipients in the 1990-91 period was completely eroded in the subsequent period. The collective farm income increased, however, by 49.56 percent.

[7]Note that many families receive wages, smallholding income etc. in addition to government transfers and, therefore, their economic situation may have changed somewhat differently than what is shown by changes in government transfers.

Table 2 Distribution of Average Income by Income and Expenditure Components

Components	1980	1985	1989	1990	1991	1992
Income Components						
Salary Income	59.6	55	56.9	57.3	51.8	46.4
Collective Farm Income	9.9	10.7	10.4	10.2	6.9	13.5
Govt Cash Benefits	13.6	14.9	12.8	13.4	19.1	10.4
Smallholding Income	9.8	11.1	9.9	10.2	11.5	19.6
Other sources	7.1	8.3	10	8.9	10.6	10.2
Total Income	100	100	100	100	100	100
Expenditure Components						
Food	39.9	36.6	32.7	32.8	38	38.3
Non food	29.9	29.6	29.6	31.4	32.3	31.9
Alcohol	2.8	2.6	2.5	2.7	2.1	2.1
Social Expenditure	8.8	8.3	8.8	8	6.2	3.7
Taxes	6.9	6.8	7.3	7.2	5.1	5.2
Other Expenditures	6.5	7.8	8.5	6.5	7.1	7.5
Savings	5.2	8.3	10.7	11.4	9.3	11.2
Total Expenditure	100	100	100	100	100.1	100

Table 3 Real Average Per Capita Income and Components

Components	1980	1985	1989	1990	1991	1992
	Income Components					
Salary Income	73.3	74.6	84.6	91.5	84.6	58
Collective Farm Income	12.2	14.5	15.5	16.3	11.3	16.9
Govt Cash Benefits	16.7	20.2	19	21.4	31.2	13
Smallholding Income	12.1	15.1	14.7	16.3	18.8	24.5
Other Sources	8.7	11.3	14.9	14.2	17.3	12.7
Total Income	123	135.6	148.6	159.6	163.4	124.9
	Expenditure Components					
Food	49.1	49.6	48.6	52.3	62.1	47.8
Non Food	36.8	40.1	44	50.1	52.8	39.8
Alcohol	3.4	3.5	3.7	4.3	3.4	2.6
Social Expenditure	10.8	11.3	13.1	12.8	10.1	4.6
Taxes	8.5	9.2	10.8	11.5	8.3	6.5
Other Expenditures	8	10.6	12.6	10.4	11.6	9.4
Savings	6.4	11.3	15.9	18.2	15.2	14
Total Expenditure	123	135.6	148.6	159.6	163.4	124.9

Table 4 Annual Growth Rate of Per Capita Real Income and Components

Components	1980 to 1985	1985 to 1989	1989 to 1990	1990 to 1991	1991 to 1992
	Income Components				
Salary Income	0.35	3.19	8.16	-7.54	-31.44
Collective Farm Income	3.51	1.68	5.16	-30.67	49.56
Govt Cash Benefits	3.88	-1.52	12.63	45.79	-58.33
Smallholding Income	4.53	-0.67	10.88	15.34	30.32
Other sources	5.37	7.16	-4.7	21.83	-26.59
Total Income	1.97	2.32	7.4	2.38	-23.56
	Expenditure Components				
Food	0.2	-0.51	7.61	18.74	-23.03
Non food	1.73	2.35	13.86	5.39	-24.62
Alcohol	0.58	1.4	16.22	-20.93	-23.53
Social Expenditure	0.91	3.76	-2.29	-21.09	-54.46
Taxes	1.6	4.09	6.48	-27.83	-21.69
Other Expenditures	5.79	4.42	-17.46	11.54	-18.97
Savings	12.04	8.91	14.47	-16.48	-7.89
Total Expenditure	1.97	2.32	7.4	2.38	-23.56

It is clear from the evidence that the income structure by source has changed quite substantially in the late 80s and the early 90s. The share of salary income has declined quite substantially from a level of 59.6 percent in 1980 to 46.4 percent in 1992 and that of farmers increased from 9.9 percent in 1980 to 13.5 percent in 1992. It is interesting to note that income from personal garden plots (small holding income) increased more or less monotonically between 1980 and 1992. The real value of this income doubled during this period. The share of this income stands at 19.4 percent in 1992 - which is the second highest after the share of wage and salary income.

Most of the smallholding income comes from the output of small household plots. Until 1989, this output was valued at state prices which were lower than private market prices. Since the government introduced the new consumer price index in 1990, prices in collective farm markets or secondary markets have been used to evaluate the output of small household plots. This change in the valuation of output could be the main reason for a large increase in the share of smallholding income.

Next, we look at the structure of expenditure components. Although the share of expenditure on food increased slightly between 1991 and 1992, real per capita expenditure on food declined quite substantially between these years. During a recessionary period, people generally try to maintain their consumption of food by cutting expenditure on other items of consumption. This does not seem to be happening in Ukraine. Food expenditure in real term declined almost as much as real non-food expenditure. This can probably be explained in terms of price changes for food and non-food items. The overall CPI increased at a faster rate than the food CPI during the 1991-92 period. This implies that the decline in the quantity of food might not be as high as indicated by the figures in Table 3.

It is interesting to note that the real outlays on "social expenditure" has declined by a massive 54.46 percent. This is understandable. Expenditure on social activities is a luxury which people would not be able to maintain. Further, it can be seen from Table 1 that the collective price index for recreation and cultural activities was higher than that of the overall CPI for the entire period of 1992 which means that the decline in the real expenditure on cultural activities would have been even larger than indicated by the figures in Table 4.

Table 2 shows that in 1992 Ukrainian families paid 5.2 percent of their income in direct taxes (including fees and fines) and at the same time received 10.4 percent of their incomes in the form of government transfers. This means that the Ukrainian government relies heavily on indirect taxes. The value-added tax (VAT) accounted for about 45 percent of general government revenues in 1992 whereas for the personal income tax this figure was only 10 percent. Excise and trade taxes and non-tax revenues accounted for 16 percent of the total tax revenues. Since indirect taxes are generally regressive, it seems that the overall tax system in Ukraine favors the rich rather than the poor.

As noted earlier the share of collective farm income increased during the period between 1980 and 1992. This suggests that the relationship between the average earnings of blue-white-collar workers and collective farmers may have changed over this period. Table 6 shows that this has indeed been the case. The ratio of average incomes of families of collective farm workers to that of industrial workers increased more or less monotonically over the period from 1980 to 1991. Since collective farm families have had much lower per capita income than the blue-white - collar families, the overall income distribution in Ukraine should have gradually become more equal between 1980 and 1991. Further, it is interesting to note that pensioner families of collective farmers also improved their relative position quite substantially during the 1980-91 period. This will have a further equalizing effect on the overall income distribution. We shall return to this issue in the next section.

Table 5 Aggregate Income Per Family Member by Types of Workers: At Current Prices - Ukraine

Family types	1980	1985	1986	1987	1988	1989	1990	1991
All families	123	141	145	148	149	162	182	349
	Worker Families							
Industry	132	151	152	154	162	174	196	377
State farm	103	120	125	127	134	143	163	318
Collective farm	96	125	129	131	136	151	171	323
	Pensioner Families							
Blue & White Collar	74	97	89	92	-	106	116	227
Collective farm	78	101	106	105	115	132	155	333

Table 6 Per Capita Income of State and Collective Farm Workers and Pensioner Families as a Percentage of Industrial Worker Families

	Worker Families							
Industry	100	100	100	100	100	100	100	100
State farm	78	79.5	82.2	82.5	82.7	82.2	83.2	84.4
Collective farm	72.7	82.8	84.9	85.1	84	86.8	87.2	85.7
	Pensioner Families							
Blue & White Collar	56.1	64.2	58.6	59.7	-	60.9	59.2	60.2
Collective farm	59.1	66.9	69.7	68.2	71	75.9	79.1	88.3

6. Wages and Salaries in Ukraine

As noted in the previous section, real per capita family income fell substantially in 1992. There is evidence that the Ukrainian economy deteriorated further in 1993. Family Budget Survey results are not available to assess the standard of living since 1992. However, data on average and minimum wages for the beginning of 1993 were provided to us by the Ukrainian statistical department. This information is summarized in Table 7. It can be observed that the total average wage and the average wage of industrial workers fell by about 10 percent between 1991 and 1992. The deterioration in wages is quite striking since 1992. In early 1993, real wages for all workers were about sixty percent of what they were in early 1992. The decline in wages among the industrial workers has been even greater.

The drastic fall in real wages is due to the deliberate wage and income policy pursued by the Ukrainian government. In an effort to control inflation, the government has suspended wage indexation and introduced tax-based wage controls on January 1, 1993. This led to a substantial reduction in real wages. Average nominal monthly wages increased by 16 percent in January and by only 9 percent in February 1993, whereas inflation rates during these months were 97.3 and 26.3 percent, respectively. These results tend to suggest that the standard of living in Ukraine is falling at a phenomenal rate. Will the government continue squeezing real wages? How much more do real wages have to fall before there is a slowing down of price inflation? While it is not possible to answer these questions, it is useful to consider what is likely to happen to the distribution of income and poverty in Ukraine. This is attempted in Sections 7, 8 and 9.

In the mean time we consider the issue of male-female differentials in earnings. The distributions of earnings among men and women are summarized in Table 8. It is evident that women on average earn considerably less than men. This conclusion holds for all levels of education and age groups. The ratio of female-male earnings varies quite substantially with respect to education and age. The ratio is highest among workers with higher education.[8]

The disparity of earnings between male and female workers exists in Ukraine despite the fact that the Soviet Union had in its constitution a provision for sexual equality. Several reasons may be given for this disparity, but the most important ones are the levels of education, age, occupational segregation and hours of labor supply. Since the results presented in Table 8 take account of education and age, the remaining two reasons, viz, occupational segregation and hours of labor supply are most likely. These two factors are likely to be less important among workers with higher education. It is, therefore, to be expected that the ratio of female-male average earnings will be highest among these workers.

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[8]Our finding that women are least discriminated against at high education level is an interesting one because the finding in other countries is often the opposite. In the West, difference between women and men is greater at higher levels of education than that for low-skilled jobs.

Table 7 Average and Minimum Wages in Ukraine

Date	At Current Prices			At Constant Prices		
	Minimum Wage	Average Wage Total	Average Wage Industry	Minimum Wage	Average Wage Total	Average Wage Industry
1990	-	247	-	0	216.7	-
1991	-	474	548.4	-	221.9	256.7
1992	-	6423.2	7885	-	198.7	243.9
Jan 91	80	-	-	67.7	-	-
April 91	145	-	-	64.9	-	-
Oct 91	185	-	-	74	-	-
Dec 91	400	-	-	134.5	-	-
Jan 92	400	1655.9	2280.8	38.2	158	217.7
Feb	400	1847.4	2622.9	31.1	143.6	203.9
March	400	2068.6	3031.7	28.2	145.6	213.4
April	400	3068.1	4529.1	24.8	190	280.4
May	900	3572.4	4508.4	45.4	180.1	227.3
June	900	5464.4	5696.7	39.5	239.6	249.8
July	900	5379.7	6715.6	30.9	185	230.9
Aug	900	5705.9	7096.5	26.8	169.9	211.3
Sep	900	7689.8	8789.1	23.3	199.3	227.7
Oct	900	8715.9	10414	18.6	180.1	215.2
Nov	2300	11314.3	14436.3	38.8	190.7	243.3
Dec 92	2300	20072.5	25385.3	27.8	243	307.4
Jan 93	4600	15802	19180	28.2	97	117.7
Feb	4600	20192	23060	22	96.6	110.3
March	4600	24857	28491	18.3	98.7	113.1
June	6900	38169	-	-	-	-

Table 8 Average Wage Earning and It's Inequality by Age and Education for Male and Female Workers and Employees: Ukraine 1989

Employees Characteristics	Male Employees		Female Employees		Ratio of Female-Male	
	Average Wage	Gini Index	Average Wage	Gini Index	Average Wage	Income Inequality
	Levels of Education					
Higher Education	236.124542	19.0183462	184.3897645	18.17798	78.1	95.6
Secondary Special	216.259565	20.9938104	144.6056877	19.41531	66.9	92.5
Secondary General	215.895647	22.5010022	143.6918695	22.29261	66 6	99.1
Incomplete Secondary	204.12568	23.9308589	140.6166197	24.30334	68.9	101.6
Primary Education	177.860896	23.4948659	129.3665318	24.12899	72.7	102.7
	Age of Employees					
16-24	176.715836	21.9304696	125.755102	20.0741	71.2	91.5
25-29	210.367413	21.08665	139.0529129	19.33895	66.1	91.7
30-39	229.616129	21.4136811	154.2772768	20.57662	67.2	96.1
40-49	230.484869	20.5815562	161.2882208	21.58169	70	104.9
> 50	205.076292	22.45246	149.5554106	23.52911	72.9	104.8

From the evidence given in Table 8, it is not possible to conclude that earnings disparity is less for women relative to that for men. This conclusion holds for workers up to the age of 39. The opposite conclusion emerges for the workers aged 40 or more. Similarly, the lower disparity for women is observed only among the workers with education levels equal to or higher than the secondary school.

An interesting question that arises is whether earning differences between men and women are widening or narrowing during the recession. This aspect will not be pursued here due to lack of data.

7. Trends in inequality in Ukraine

Table 9 presents the inequality measures for Ukraine calculated from the family budget surveys covering the period from 1980 to 1992. The table gives the quintile shares, Gini index and decile distribution ratio (DDR). The DDR is defined as the share of the bottom 40 percent in relation to the share of the top 20 percent. An increase in this measure will imply a reduction in income inequality. All these measures have been computed by assigning each individual in a household an income level equal to the per capita income of that household. Thus, these measures indicate inequality in individual income distribution.

Table 9 Inequality of Per Capita Aggregate Family Income: Ukraine 1980 to 1992

Quintiles	Years					
	1980	1985	1989	1990	1991	1992
1st	8.13	7.09	9.41	10.35	11.01	10.56
2nd	13.04	14.83	13.99	14.31	14.72	15.53
3rd	16.04	16.37	17.37	17.51	17.82	16.07
4th	19.83	20.51	21.33	22.83	23.99	23.69
5th	42.96	41.2	37.9	35	32.46	34.15
Gini Index	34.64	32.16	26.5	25.13	21.8	23.4
Decile Destribution Ratio	49.28	53.2	61.74	70.46	79.27	76.4

The results are quite striking. Inequality declined monotonically between 1980 to 1991, but rose between 1991 to 1992. This is indicated by the Gini index as well as the DDR. The share of the first quintile increased monotonically between 1985 to 1991, then fell in 1992. The share of the top quintile declined monotonically between 1980 to 1991 and then rose in 1992. The Lorenz curves for the years 1985, 1989, 1990 and 1991 shift gradually upwards at all points. This implies that income distribution in Ukraine became gradually more equal between 1985 to 1991. Since the Lorenz curves for the years 1991 and 1992 intersect, we cannot unambiguously state that income inequality rose between 1991 and 1992 although this conclusion holds on the basis of the Gini index and the DDR.

The question that arises is: why has inequality declined consistently during the 1980-1991 period? The evidence given in Table 6 provides a partial answer. The families of state and collective farm workers were generally poorer than those of industrial workers. The results in Table 6 suggest that the income gap between these families narrowed quite substantially between 1980 and 1990 which would have made the income distribution more equal. Further, it is interesting to note that the pensioner families of both blue and white collar workers and collective farmers also improved their relative incomes (compared to industrial workers) between 1980 and 1991. For instance, in 1980, the average per capita income of pensioner families of collective farm workers was about 59 percent of that of industrial workers, but this percentage increased to 88.3 percent by 1991. This would clearly have an equalizing effect on the distribution of income.

We may also attempt to explain changes in income inequality by means of observed changes in income components. The shares and distribution of income components are presented in Table 10. The information in Table 10 could be compiled only for the years 1989, 1991 and 1992 because of non-availability of the appropriate data for other years.

Results in the table show that the income structure has changed quite substantially in the years between 1989 to 1991 and 1991 to 1992. The percentage share of salary income decreased monotonically during the three year period. This may be due to the effect of the recession which occurred during this period. It is interesting to note that the share of income from small holdings such as family plots increased quite substantially during this period. This is understandable. When people lose their jobs due to a recession, they divert their efforts to small holdings to maintain their standard of living.

The concentration index of an income component measures how evenly or unevenly that income component is distributed over the per capita total family income. It can be seen that the concentration index of wage and salary income is 32.8 in 1989, which is considerably higher than the Gini index of total per capita family income. This implies that income from wages and salary is unevenly distributed over the total income in favor of richer families. From quintile shares, it can be seen that the first quintile gets only 6.1 percent of total wage income whereas the top quintile gets more than 40 percent of total wage and salary income. The collective farm income is also unevenly distributed in favor of richer households but its regressivity is less than that of wage and salary income in the non-farm sector.

The concentration index of income from government transfers is -0.7 which implies that this income component is more or less distributed on a per capita basis with no focus on the poor.[9] Although the overall effect of government transfers is to reduce the inequality of total income, the magnitude of the effect is small. The progressivity of government transfers can easily be increased by focusing them on the poor rather than distributing them on a per capita basis. It is unfortunate that the progressivity of government benefits in fact fell considerably in 1992. The value of the concentration index for government transfers changed from -0.5 in 1991 to 14.2 in 1992. From the quintile shares we note that the share of the government transfers going to the bottom 20% of individuals reduced dramatically in 1992 while the share of the top 20 percent of people increased from 20.87 percent in 1991 to 29.16 percent in 1992. During recession the government should target its scarce resources but in Ukraine exactly the opposite happened. The greater proportion of government transfers went to the richer families in 1992. Since we do not have the breakdown of government transfers, it is not possible to explain why the government transfers became less progressive in 1992.

The last column in Table 10 gives the % contribution of each income component to the total inequality. In 1989, the contribution of salary income of blue and white collar worker was 70.7 percent which fell substantially to only 62.1 percent in 1992. This shows that the changes in wage and salary income structure led to a considerable reduction in total income inequality. In 1992, the share of smallholding income was 19.8 percent but it contributes only 16.6 percent to total inequality. It would seem then that any policy that increases the smallholding income has an equalizing effect on the size distribution of total income.

Table 11 presents inequality of total income by its expenditure components. The personal income tax paid by the families is shown as an item of expenditure. It can be seen that the share of taxes to total family income declined from 7.3 percent in 1989 to only 5.1 percent in 1991. Since the concentration index of taxes is considerably larger than the Gini index for total income, taxes can be said to be highly progressive. So the decline in the share of taxes would have the effect of increasing the inequality of total income in the 1989 and 1991 period. In the subsequent period (from 1991 to 1992) the share of taxes remained more or less the same whereas their concentration increased from 32.1 percent in 1991 to 38.7 percent in 1992. This would have an effect of decreasing the inequality of total income in the 1991-92 period.

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[9]The absence of targetting of government transfers is a common finding for socialist countries, see for instance Milanovic (1993).

Table 10 Income Inequality by it's Components

Income Components	Quintile Shares					% Share	Concentration Index	% contrib. to total Inequality
	1st	2nd	3rd	4th	5th			
	Year 1989							
Salary Income	6.1	12.31	17.77	23.05	40.77	56.9	32.8	70.7
Collective Farm Income	10.07	13.16	15.53	20.02	41.22	10.4	28.5	11.2
Govt Cash Benefits	21.8	20.92	17.94	16.37	22.97	12.8	-0.7	-0.3
Smallholding Income	10.64	14.91	17.54	20.04	36.87	9.9	23.8	8.9
Other sources	10.48	14.54	16.17	20.47	38.34	10	25.4	9.6
Total Income	9.41	13.99	17.37	21.33	37.9	100	26.4	100.1
	Year 1991							
Salary Income	7.51	13.43	18.11	25.39	35.56	51.8	28.5	67.7
Collective Farm Income	12.7	15.79	16.98	22.77	31.76	6.9	18.8	6
Govt Cash Benefits	21.65	19.13	18.62	19.73	20.87	19.1	-0.5	-0.4
Smallholding Income	8.99	13.31	16.28	25.47	35.95	11.5	27.5	14.5
Other sources	10.05	13.83	17.19	24.03	34.9	10.6	25	12.2
Total Income	11.01	14.72	17.82	23.99	32.46	99.9	21.8	100
	Year 1992							
Salary Income	7.97	13.83	14.46	23.86	39.88	46.4	31.3	62.1
Collective Farm Income	13.69	18.31	18.65	23.15	26.2	13.5	12.4	7.2
Govt Cash Benefits	14.4	17.37	17.6	21.47	29.16	10.4	14.2	6.3
Smallholding Income	11.41	16.36	16.93	24.35	30.95	19.6	19.8	16.6
Other sources	12.62	16.16	16.8	24.65	29.77	10.2	18	7.8
Total Income	10.56	15.53	16.07	23.69	34.15	100.1	23.4	100

Table 11 Income Inequality by Expenditure Components

Expenditure Components	Quintile Shares					% Share	Concentration Index	% contrib. to total Inequality
	1st	2nd	3rd	4th	5th			
	Year 1989							
Food	13.33	16.44	18.05	20.45	31.73	32.7	16.8	20.7
Non food	8.66	13.8	17.7	22.23	37.61	29.6	27.3	30.5
Alcohol	8.58	13.93	16.88	21.4	39.21	2.5	28.2	2.7
Social Expenditure	9.83	15.57	18.79	22.31	33.5	8.8	22.2	7.4
Taxes	5.48	11.41	17.13	22.92	43.06	7.3	35.5	9.8
Other Expenditures	7.09	11.61	15.24	19.6	46.46	8.5	35.7	11.5
Savings	3.89	9.3	15.24	20.95	50.62	10.7	43.3	17.5
Total Expenditure	9.41	13.99	17.37	21.33	37.9	100.1	26.5	100.1
	Year 1991							
Food	14.85	16.75	18.5	22.33	27.57	38	12.9	22.5
Non food	10.11	14.44	17.89	24.44	33.12	32.3	23.4	34.7
Alcohol	10.76	14.32	17.34	24.41	33.17	2.1	22.9	2.2
Social Expenditure	11.4	15.29	19.44	23.33	30.54	6.2	19.4	5.5
Taxes	6.5	12.37	17.15	25.73	38.25	5.1	32.1	7.5
Other Expenditures	9.57	12.23	15.08	24.67	38.45	7.1	29.2	9.5
Savings	1.83	10.24	16.29	28.04	43.6	9.3	42.4	18.1
Total Expenditure	11.01	14.72	17.82	23.99	32.46	100.1	21.8	100

Table 11 *(continued)*

	Year 1992							
Food	14.85	16.75	18.5	22.33	27.57	38.3	14.1	23.2
Non food	10.11	14.44	17.89	24.44	33.12	31.9	24.2	33.1
Alcohol	10.76	14.32	17.34	24.41	33.17	2.1	22.5	2
Social Expenditure	11.4	15.29	19.44	23.33	30.54	3.7	20.7	3.3
Taxes	6.5	12.37	17.15	25.73	38.25	5.2	38.7	8.6
Other Expenditures	9.57	12.23	15.08	24.67	38.45	7.5	34.1	11
Savings	1.83	10.24	16.29	28.04	43.6	11.2	39.2	18.8
Total Expenditure	11.01	14.72	17.82	23.99	32.46	99.9	23.3	100

It may be enlightening to explain the change in the inequality of total income in terms of its income or expenditure components. This may easily be done by means of equation (3) which can also be written as

$$G = \sum_{j=1}^{k} w_j C_j \tag{15}$$

where G is the Gini index of the total income, C_j is the concentration index of the jth income or expenditure component and $w_j = \mu_j/\mu$ is the share of the jth income or expenditure component.

Suppose that over a period, income or expenditure shares change from w_j to w_j^* which may be accompanied by changes in their concentration indices from C_j to C_j^*. These changes would change the inequality of total income from G to G^*, which from (15) can be written as

$$G^* - G = \sum_{j=1}^{k} (w_j^* C_j^* - w_j C_j) \tag{16}$$

which shows that $(w_j^* C_j^* - w_j C_j)$ will be the contribution of the jth income or expenditure component to the change in the inequality of total income. This contribution may be further decomposed into two components; one, due to a change in the share of the jth income component and second, due to a change in the distribution of the jth income component. These individual components may be written as

$$(w_j^* C_j^* - w_j C_j) = \frac{1}{2}(w_j^* - w_j)(C_j + C_j^*) + \frac{1}{2}(C_j^* - C_j)(w_j + w_j^*) \tag{17}$$

in which the first term on the right side measures the effect of a change in the share of the jth income component and the second term measures the effect of a change in the distribution of the jth income component.

Substituting (17) into (16) gives

$$G^* - G = \frac{1}{2}\sum_{j=1}^{k} (w_j^* - w_j)(C_j + C_j^*) + \frac{1}{2}\sum_{j=1}^{k} (C_j^* - C_j)(w_j + w_j^*) \tag{18}$$

The calculations using (18) are presented in Tables 12 and 13. The conclusions emerging from them are summarized below.

The Gini index of total income declined by 4.7 points between 1989 and 1991. The major cause of this reduction was the salary income of blue and white collar workers which contributed a reduction of 3.9 points. The reduction in the share of salary income caused a reduction in total inequality by 1.6 points and the remaining reduction of 2.3 points in total income inequality was caused by the redistribution of salary income in favor of the poorer families.

Changes in collective farm income led to a reduction of 1.7 points in total inequality. Of this reduction, 0.8 points was due to a change in the share of collective farm income and the remaining reduction of .9 points was caused by the redistribution of this income component in favor of poorer families.

Table 12 Explaining Changes in Inequality in Terms of Income Components

Income Components	Due to Changes in Income Comp Shares	Due to Changes in Income Comp Distribution	Total Change due to Income Components
Change in Inequality between 1989 to 1991			
Salary Income	-1.6	-2.3	-3.9
Collective Farm Income	-0.8	-0.9	-1.7
Govt Cash Benefits	0	0	0
Smallholding Income	0.4	0.4	0.8
Other sources	0.2	-0.1	0.1
Total Income	-1.8	-2.9	-4.7
Change in Inequality between 1991 to 1992			
Salary Income	-1.6	1.4	-0.2
Collective Farm Income	1	-0.6	0.4
Govt Cash Benefits	-0.6	2.2	1.6
Smallholding Income	1.9	-1.2	0.7
Other sources	-0.1	-0.7	-0.8
Total Income	0.6	1.1	1.7

The share of salary income of blue and white collar workers continued to decline during the 1991-92 period resulting in reduction of inequality by 1.6 points. In this period the wage and salary income was redistributed in favor of the richer households resulting in increase in income inequality by 1.4 points. Thus the net effect of the salary income of blue and white collar workers was to decrease inequality by only 0.2 points.

Government transfers had no effect on the inequality in the 1989-91 period. But in the subsequent period, government transfers caused an increase in total inequality by 1.6 points. This increase came about mainly from the redistribution of government benefits in favor of richer families. These results strongly suggest that the existing social sector policies must be changed. Government benefits must be targeted on the poor.

In the 1989-91 period, the small-holding income had the effect of increasing inequality by 0.8 points. Of this increase, .4 was due to an increase in its share and the remaining increase of 0.4 points was due to redistribution of this income in favor of richer households. In the subsequent period, the share of smallholding income increased substantially from 11.5 percent in 1991 to 19.6 percent in 1992. This would have resulted in an increase in inequality by 1.9 points but the redistribution of this income in favor of poorer households resulted in a reduction in inequality by 1.2 percent. So the net contribution of the smallholding income was to increase inequality by only .7 points.

The redistribution of smallholding income in favor of poorer households is an interesting observation particularly when the country is faced with severe economic crisis. In this connection, Milanovic (1993) has made an observation that in the early stages of reform, an increase in smallholding income decreases income inequality but after a while this income component may become unequalizing. His observation made in connection with eastern European countries suggests that Ukraine is at an early stage of reform.

So far we have measured the inequality of before tax income. The after tax income (or disposable income) is, obviously, a better measure of welfare than the before tax income. To compute the Gini index of after tax income, we used the following formula due to Kakwani (1980):

$$G^* = G - \frac{e(C-G)}{(1-e)} \tag{19}$$

where G^* is the Gini index of per capita after tax income and G the Gini index of per capita before tax income: C is the concentration index of per capita tax paid by an individual and e is the average tax rate of the society. This formula is valid if we assume that the taxes do not significantly change the ranking of individuals. Since the average tax in Ukraine is small, it will have negligible effect on the individual rankings.

Table 13 presents the Gini indices before and after tax incomes. The last column in the table gives the redistributive effect of taxes which is the difference between the Gini index of after and before tax income. It can be seen that taxes do reduce the inequality but the magnitude of reduction is not very large. This is due to the fact that the share of taxes in the total income is very small. As observed earlier, Ukraine depends heavily on indirect taxes which can be quite regressive. It may seem appropriate to change the tax system so that the share of income tax is increased and that of indirect taxes decreased.

Table 13 Redistributive Effects of Direct Taxes

Year	Gini index		Redistribution Effect of Taxes
	Per capita before tax income	Per capita after tax income	
1989	26.5	25.8	-0.7
1991	21.8	21.2	-0.6
1992	23.4	22.6	-0.8

8. Trends in Welfare in Ukraine

To compare welfare levels over time, we have plotted the generalized Lorenz curve for each year. It was observed that the generalized Lorenz curve shifted upward gradually during the period from 1980 to 1991. But in 1992 it shifted down. This demonstrates that welfare in Ukraine increased gradually until 1991 and then it fell to a level below that for 1985. These conclusions are valid for any welfare function which is symmetric and quasi-concave in incomes.

The generalized Lorenz curve can only rank the income distributions for different years without telling the magnitudes of increase or decrease. To enable us to make statements about the magnitudes, it will be necessary to compute single measures of welfare. A single measure of welfare given by equation (1) takes into account both the size and distribution of income. The estimates of this measure along with its growth rates are presented in Table 14.

Table 14 Welfare in Ukraine 1980-92

Year	Average Per Capita Real Income	Average Per Capita Welfare	Annual Growth Rate	
			Per Capita Real Income	Per Capita Welfare
1980	123	80.4	-	-
1985	135.6	92	1.97	2.73
1989	148.6	109.2	2.32	4.38
1990	159.6	119.5	7.4	9.43
1991	163.4	127.8	2.38	6.95
1992	124.9	95.7	-23.56	-25.12

It is evident that during the period between 1980 and 1991, welfare in Ukraine grew at a faster rate than per capita real income. The reason is that growth in real income was accompanied by a substantial reduction in income inequality during these eleven years. But during the period from 1991 to 1992, real per capita income declined by 23.56 percent. Per capita welfare declined at an even faster rate by 25.12 percent. This means that the decline in real income was accompanied by an increase in income inequality during the 1991-92 period.

We may now attempt to explain the changes in welfare in terms income and expenditure components. Table 15 presents the contribution of each component to the total welfare. As can be seen from the table the wage and salary income of the blue and white collar workers contributed 52 percent to total welfare in 1989. This contribution fell gradually to only 41.6 percent in 1992. This means that the wage and salary income of the blue and white collar workers became considerably less important in explaining welfare in the recessionary period.

Government cash benefits contributed 17.5 percent to total welfare in 1989. This contribution increased to 24.5 percent in 1991 and then fell to only 11.7 percent in 1992. The welfare contribution of collective farm income and income from smallholdings increased quite substantially in 1992. The contribution of incomes from other sources remained more or less constant during the 1989-92 period.

Table 15 also presents results on welfare elasticity and the progressivity index for each income and expenditure component. The welfare elasticity for salary income was 0.42 in 1992; it means that if salary income on average increases by 1 percent total welfare increases by only 0.42 percent. The elasticity for government cash transfers in 1992 was found to be only 0.12 which means that an average increase of 1 percent government transfers increases total average welfare by 0.12 percent. Can we conclude from these observations that salary income is welfare superior to government transfers? The answer is obviously no. A welfare comparison of the two income components cannot be made without taking into account the cost involved in increasing the welfare. The progressivity index derived in (7) makes this cost adjustment. A positive (negative) value of this index implies that the income component is progressive (regressive) favoring the poor (richer) families. This index suggests that salary income is regressive indicating that any policy to increase wage and salary income will favor richer families more than poorer families.

It is important to note that government cash transfers became gradually less progressive during the 1989 to 1992 period. Collective farm income was regressive in 1989 with a value of the index equal to -0.03, but in 1992 its value increased to 0.14, thus making this income component progressive. Similarly, the income from smallholdings was regressive in 1991 but became progressive in 1992.

Turning to expenditure components, it is observed that food is the most regressive expenditure item. This is understandable because the poor spend a greater proportion of their income on food. If the government decides to impose a tax on food, the poor will be disadvantaged more severely than the rich. It is interesting to note that personal income tax is progressive throughout. As a matter of fact the progressivity of taxes increased over the 1991-1992 period.

Table 15 Welfare by Income and Expenditure Components

Income or Expenditure Components	1989			1991			1992		
	% Contrib. of comp to total welfare	Welfare Elasticity of each comp	Progress Index of each comp	% Contrib. of comp to total welfare	Welfare Elasticity of each comp	Progress Index of each comp	% Contrib. of comp to total welfare	Welfare Elasticity of each comp	Progress Index of each comp
Salary Income	52	0.52	-0.09	47.3	0.47	-0.09	41.6	0.42	-0.1
Collective Farm Income	10.1	0.1	-0.03	7.2	0.07	0.04	15.5	0.16	0.14
Govt Cash Benefits	17.5	0.18	0.37	24.5	0.25	0.29	11.7	0.12	0.12
Smallholding Income	10.2	0.1	0.04	10.7	0.11	-0.07	20.5	0.21	0.05
Other sources	10.2	0.1	0.01	10.2	0.1	-0.04	10.9	0.11	0.07
Total Income	100	1	0	100	1	0	100	1	0
	Expenditue Components								
Food	37	0.37	-0.13	42.3	0.42	-0.11	42.9	0.43	-0.12
Non food	29.3	0.29	0.01	31.6	0.32	0.02	31.5	0.32	0.01
Alcohol	2.4	0.02	0.02	2.1	0.02	0.01	2.1	0.02	-0.01
Social Expenditure	9.3	0.09	-0.06	6.4	0.06	-0.03	3.8	0.04	-0.03
Taxes	-6.4	-0.06	0.12	-4.4	-0.04	0.13	-4.2	-0.04	0.2
Other Expenditures	7.4	0.07	0.13	6.4	0.06	0.09	6.4	0.06	0.14
Savings	8.3	0.08	0.23	6.9	0.07	0.26	8.9	0.09	0.21
Total Expenditure	87.3	0.86	0	100	1	0	100	1	0

Next, we attempt to explain changes in welfare in terms of income and expenditure components. Suppose the average jth income component changes from μ_j to μ_j^* and its concentration index from C_j to C_j^*, then the total change in welfare may be written as

$$W^* - W = \sum_{j=1}^{k} [(\mu_j^*(1-C_j^*) - \mu_j(1-C_j)] \tag{19}$$

where use has been made of (4), which shows that $\mu_j^*(1-c_j^*) - \mu_j(1-c_j)$ is the contribution of the jth income component to the total change in welfare. This contribution is further decomposed into two components; one due to a change in the mean of the jth income component and second due to a change in the distribution of the jth income component across total family income. Thus,

$$\mu_j^*(1-C_j^*) - \mu_j(1-C_j) = \frac{1}{2}(\mu_j^* - \mu_j)(2-C_j-C_j^*) + \frac{1}{2}(C_j^* - C_j)(\mu_j^* + \mu_j) \tag{20}$$

Substituting (20) into (19) gives

$$w^* - w = \frac{1}{2}\sum_{j=1}^{k}(\mu_j^* - \mu_j)(2-C_j-C_j^*) + \frac{1}{2}\sum_{j=1}^{k}(C_j^* - C_j)(\mu_j^* + \mu_j) \tag{21}$$

The calculations based on (21) are presented in Tables 16 and 17.

It can be seen that real per capita welfare increased by 18.6 rubles (at 1980 prices) between 1989 and 1991. The major share of this increase came from government cash transfers which improved the per capita welfare by 12.2 rubles. Most of this increase came from the increase in the real value of government transfers (12.3 rubles). This means that the distribution of government transfers did not change significantly during this period.

It is interesting to note that wage and salary income (of the blue and white collar workers) added only 3.6 rubles to total welfare. And all of this increase came from the redistribution of wage and salary income in favor of the poorer families. The collective farm income led to a fall in total per capita welfare by 1.9 rubles between 1989 and 1991. Of this 1.9 rubles reduction, a fall of 3.2 rubles was due to a sharp decline in average income from farm income, but the redistribution of this income component in favor of the poorer families led to an increase in welfare of 1.3 rubles. Small holding income contributed to an increase in welfare of 2.4 rubles in the 1989-91 period.

Trends changed dramatically between 1991 and 1992. Per capita welfare declined by 32.1 rubles. A large proportion of this reduction is explained in terms of movements in salary income and government cash transfers. The average levels of both these components declined sharply and at the same time, both these components redistributed income away from the poorer families.

Table 16 Explaining Changes in Welfare in Terms of Income Components

Income Components	Due to Changes in Income Comp Averages	Due to Changes in Income Comp Distribution	Total Change due to Income Components
	Change in Welfare between 1989 to 1991		
Salary Income	0	3.6	3.6
Collective Farm Income	-3.2	1.3	-1.9
Govt Cash Benefits	12.3	-0.1	12.2
Smallholding Income	3	-0.6	2.4
Other sources	1.8	0.5	2.3
Total Income	13.9	4.7	18.6
	Change in Welfare between 1991 to 1992		
Salary Income	-18.6	-2	-20.6
Collective Farm Income	4.7	0.9	5.6
Govt Cash Benefits	-17	-3.2	-20.2
Smallholding Income	4.4	1.6	6
Other sources	-3.6	0.7	-2.9
Total Income	-30.1	-2	-32.1

Table 17 Explaining Changes in Welfare in Terms of Expenditure Components

Income Components	Due to Changes in Exp Comp Averages	Due to Changes in Exp Comp Distribution	Total Change due to Exp Components
	Change in Inequality between 1989 to 1991		
Food	11.5	2.2	13.7
Non food	6.6	1.9	8.5
Alcohol	-0.2	0.2	0
Social Expenditure	-2.4	0.3	-2.1
Taxes	1.7	-0.4	1.3
Other Expenditures	-0.7	0.8	0.1
Savings	-0.4	0.1	-0.3
Total Expenditure	12.7	5.9	18.6
	Change in Inequality between 1991 to 1992		
Food	-12.4	-0.6	-13
Non food	-9.9	-0.4	-10.3
Alcohol	-0.6	0	-0.6
Social Expenditure	-4.4	-0.1	-4.5
Taxes	1.2	0.5	1.7
Other Expenditures	-1.5	-0.3	-1.8
Savings	-0.7	0.5	-0.2
Total Expenditure	-30.7	-1.4	-32.1

It is interesting to note from Table 17 that changes in taxes led to an improvement in welfare in both the periods, viz, during 1989-91 and 1991-92. The average level of taxes declined which had the effect of improving per capita welfare. In the 1991-92 period, taxes also became progressive which improved welfare by 0.5 rubles.

9. Poverty in Ukraine

To measure poverty, we need to know the poverty line - a threshold level of income below which an individual is poor. The most common approach to defining a poverty line is to estimate the cost of a bundle of goods and services which would ensure that the so called "minimum basic needs" of individuals are just met. To estimate such costs, the first step involves estimating the minimum money cost for food which would satisfy the average nutritional needs of families of different sizes. To these costs, one must add the rent paid and certain minimum amounts for clothing, fuel and sundries to arrive at a poverty line for a family of a given size. This approach to specifying the poverty line pioneered by Rowntree (1901) may be called the physical subsistence approach.[10]

The physical subsistence approach has been used in the USSR at least since 1918. Khrushchev used the subsistence minimum basket as part of the framework for the 1959-65 Seven Year Plan ((see McAuley (1979), Matthews (1986) and more recently Atkinson and Michlewright (1992)). In 1988, Goskomstat estimated the minimum basket to be 78 rubles per month.

The Government of Ukraine has developed its own minimum consumption basket to target households with low incomes. The cost of this basket at January 1993 prices was 14345 coupons per month. The food and non-food costs of this basket are as follows.

1. Food products	9490
2. Non-food products 3,083 including	3083
(a) Clothes, underwear and footware	1488
(b) hygiene and sanitary items, medicine	391
(c) household and everyday use items	1113
3. Services	1103
4. Taxes and payments	669
Total	14345

[10] A brief but illuminating discussion of this approach is given in Sen (1979).

It can be seen that the cost of the total basket (14345 coupons) is about 1.51 times the cost of food products (9490 coupons) in the basket. The multiplier of 1.51 may be considered to be too high. Kendall, Mills, Munoz and Sahn (1993) suggested a multiplier of 1.25 which they regarded to be adequate and realistic, given the extensive subsidies to housing, health care, education, public transport, and so forth. If we applied this multiplier, the total cost of the basket would be reduced to 11862 coupons per month which is about 82 percent of the cost of the official basket.

It is interesting to note that the poverty line of 78 rubles in 1988 if adjusted for price changes amounted to a value of 11878 coupons per month in January 1993. Thus, our derived basket of 11862 coupons (based on a multiplier of 1.25) is almost identical to the Goskomstat basket.

In the present paper we have used two poverty lines. The cost of the official basket of the Ukrainian government is our first poverty line. Our second poverty line is equal to 11862 coupons per month (which is derived from the food cost of the official basket multiplied by 1.25). We define the families whose per capita income is below the second poverty line as "ultra poor"; those whose physical personal maintenance is unstable ((Lipton (1988)). The fixed poverty lines in January 1993 prices were converted to those in current prices by means of the price indices given in Table 1. The results are presented in Table 18.

Table 18 Poverty in Ukraine

Year	Poor			Ultra Poor		
	Poverty line in current prices	Head Count Ratio	Poverty Gap Ratio	Poverty line in current prices	Head Count Ratio	Poverty Gap Ratio
1980	88	38.04	11.37	72.9	23.23	7.3
1985	91.6	28.37	7.55	75.8	14.41	4.67
1989	96	17.93	4.18	79.5	8.56	2.3
1990	100.4	11.53	2.29	83.1	5.49	1.01
1991	188	8.76	1.33	155.7	3.2	0.43
1992	2845.8	29.75	6.86	2356.4	16.88	3.45

Having decided upon the poverty line, we next compute poverty indices which would measure the intensity of poverty. The head-count measure, while widely used, is a crude poverty index because it does not take account of the income-gap among the poor. If the degree of misery suffered by an individual is proportional to the income shortfall of that individual from

the poverty line, then the sum total of these shortfalls may be considered an adequate measure of poverty. Such a measure is called the poverty gap ratio and can be written as

$$g = \int_0^z g(x)f(x)dx = \frac{H(z-\mu_p^*)}{z} \qquad (22)$$

where $g(x) = \frac{(z-x)}{z}$, z being the poverty line, f(x) is the density function of income x, H is the head-count ratio and μ_p is the mean income of the poor.

The measure g will provide adequate information about the intensity of poverty if all the poor are assumed to have exactly the same income, which is less than the poverty line. In practice, the income among the poor is unequally distributed and, therefore, g will not be sensitive to income inequality among the poor. Several poverty measures have been proposed in the literature which are sensitive to income inequality among the poor ((Sen (1976); Kakwani (1980); Foster, Greer and Thorbecke (1984) and Takayama (1979). Since we have at our disposal only the grouped data, it will not be possible to estimate these measures accurately particularly when the number of groups are very small. The present paper uses only the two measures of poverty, viz, head-count ratio and poverty gap ratio. The results are presented in Table 18.

It is evident that poverty in Ukraine declined monotonically over the 1980-91 period. In 1980, 38 percent of individuals were below the poverty line but this figure reduced to only 8.76 percent in 1991. But in 1992 poverty increased to a massive figure of 29.75 percent. The same conclusion emerges if poverty is measured by the poverty gap ratio.

In 1990, 23.23 percent of the population were in the ultra poor category. This is a very high figure but it is interesting that the percentage of the ultra poor dropped to only 3.2 percent in 1991. This shows that Ukraine made tremendous progress in alleviating poverty until 1991 but this achievement turned into a disaster in subsequent periods. In 1992, the percentage of the ultra poor was 16.88. As we noted earlier, the Ukrainian standard of living (measured by wages) has been falling at a phenomenal rate since January 1993. We expect that poverty would by now have increased to an unacceptably catastrophic level.

To explain changes in poverty, we use a poverty decomposition procedure given in Kakwani and Subbarao (1992).[11] This decomposition enables one to separate the impact on poverty of changes in mean income and in its inequality.

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[11]Datt and Ravallion (1992) have also dealt with this issue but their decomposition is different from the one used here.

Let us consider two years, viz, the base year and the terminal year. θ is the poverty measure which is a function of the mean income and the Lorenz curve. Therefore, the poverty index in the base year is given by

$$\theta_{00} = \theta(\mu_0, L_0(p))$$

where μ_0 is the mean income in the base year and $L_0(p)$ the Lorenz curve in the base year, where p varies from 0 and 1.

Similarly, the poverty index in the terminal year is given by

$$\theta_{11} = \theta(\mu_1, L_1(p))$$

where μ_1 and $L_1(p)$ are the mean income and the Lorenz curve in the terminal year.

Then the change in poverty is given by

$$T = \theta_{11} - \theta_{00}$$

which we call as the total poverty effect.

There is also the pure growth effect which is defined as the change in poverty level if the mean income were to change but the relative income distribution measured by the Lorenz curve remained unchanged. This effect can be measured by (Kakwani and Subbarao (1992)).

$$G = \frac{1}{2} [\theta_{10} - \theta_{00} + \theta_{11} - \theta_{01}]$$

where

$$\theta_{10} = \theta(\mu_1, L_0(p))$$

$$\theta_{01} = \theta(\mu_0, L_1(p))$$

Similarly, the pure inequality effect is defined as the change in poverty if the Lorenz curve were to change but the mean income remained the same. This effect can be measured by

$$I = \frac{1}{2} [\theta_{01} - \theta_{00} + \theta_{11} - \theta_{10}]$$

then it is easy to show that

$$T = G + I \qquad (23)$$

which implies that the total change in poverty T is equal to the sum of the growth and inequality effects.

The calculations of T, G and I are presented in Table 19.

Table 19 Explaining Changes in Poverty

Years	Head Count Ratio			Poverty Gap Ratio		
	Total Change in Poverty	Due to Growth	Due to Inequality	Total Change in Poverty	Due to Growth	Due to Inequality
	Poor					
1980 to 1985	-9.67	-8.69	-0.98	-3.82	-2.3	-1.52
1985 to 1989	-10.44	-6.99	-3.45	-3.37	-1.57	-1.8
1989 to 1990	-6.4	-4.04	-2.36	-1.89	-0.84	-1.05
1990 to 1991	-2.77	-0.94	-1.83	-0.96	-0.2	-0.76
1991 to 1992	20.99	17.13	3.86	5.53	4.01	1.52
1980 to 1992	-8.29	-3.53	-4.76	-4.51	-0.9	-3.61
	Ultra Poor					
1980 to 1985	-8.82	-4.51	-4.31	-2.63	-1.69	-0.94
1985 to 1989	-5.85	-3.06	-2.79	-2.37	-0.96	-1.41
1989 to 1990	-3.07	-2.38	-0.69	-1.29	-0.38	-0.91
1990 to 1991	-2.29	-0.59	-1.7	-0.58	-0.08	-0.5
1991 to 1992	13.68	9.94	3.74	3.02	1.97	1.05
1980 to 1992	-6.35	-0.6	-5.75	-3.85	-1.14	-2.71

As we noted earlier, poverty in Ukraine increased sharply in the 1991-92 period. On the basis of the head-count ratio, the total increase in poverty was 20.99 percent. The question we ask is: how much of the total increase in poverty can be explained in terms of changes in the mean income and income inequality. It can be seen that 17.13 percent of the increase in poverty was due to a decrease in the per capita income and the remaining 3.86 percent due to the increase in income inequality. During the same period ultra poverty increased by 13.68 percent of which 9.94 percent was due to decrease in per capita income and 3.74 percent due to an increase in income inequality. This shows that the increase in inequality has a greater effect on ultra poverty than that on poverty.

Looking at the entire period 1980 to 1992, it can be seen that the poverty in Ukraine decreased quite substantially. A larger proportion of this decline came about as a result of redistribution of income in favor of poorer families. For instance, the poverty gap ratio shows that the poverty decreased by 4.51 points; the growth in per capita income contributed only 0.9

to this decline and the remaining decline in poverty was due to the redistribution of income in favor of the poorer households. Thus, we may conclude that it was the lack of economic growth which led to a lower reduction in poverty in Ukraine between 1980 to 1992.[12]

10. Comparing Ukraine with other Soviet Republics

It is always very difficult to make international comparisons of inequality. The major difficulty is the availability of comparable data from different countries. Since the data from different republics of the USSR are quite similar, it will be possible to make a cross-republic comparisons of income inequality and welfare. The year book of the USSR provides data on income distribution for 1990 with seven income groups. We used a general interpolation device to compute quintile shares and the Gini index. The results are presented in Table 20.

It is evident that income inequality varies quite widely among the republics. Inequality as measured by the Gini index is lowest in Ukraine. The highest inequality is found in Azerbaijan with the Gini index of 30.05. The other republics with very high inequality levels are Georgia, Kazakhstan and Turkmenistan. Ukraine and Belarus have quite similar inequality patterns.

Table 21 presents real per capita family income in 1980 Ukrainian prices. Welfare in 1990 was computed using the formula given in (1). According to this table, it is found that the richest republics are Estonia and Latvia. The ranking of Russia was 13 in 1980 and 1985 which became 12 in subsequent periods. The poorest republic is Tjikistan followed by Azerbaijan. On the basis of per capita income, Ukraine's ranking remained 9th throughout the period between 1980 and 1990. If we take into account income inequality in measuring welfare, Ukraine's ranking rises to 11th in 1990.

The major conclusion that emerges from Table 21 is that there existed substantial regional disparities in the Soviet Union. Although the reduction of regional disparities was one of the major goals of the Soviet government, disparities between republics continued to exist. This observation has been made earlier by McAuley who states: "Although all republics in the USSR enjoyed increases in per capita incomes, there was little if any reduction in interrepublican variation. If the Soviet government did become more concerned about the extent of regional disparities in the standard of living in the late fifties, and if it actively sought to reduce them, its policies must be judged to have failed during the 1960s", (1979, pp.99).

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[12]Note that poverty in Ukraine reduced by 29.28 percent in the 1980 to 1991 period and about 70 percent of the reduction is explained by the growth in per capita income and the remaining 30% was due to income redistribution in favour of poor households. But during the subsequent period (1991 to 1992) a large deterioration in economic growth changed this situation.

Table 20 Inequality in USSR Republics in 1990

Republics	Quintiles					Gini Index	Ranking by Gini Index
	1st	2nd	3rd	4th	5th		
Russia	10.1	13.1	17.9	21.9	37	26.6941	9
Ukraine	11	13	19.3	21.9	34.8	24.18871	1
Belarus	11	14	17.7	21.9	35.4	24.37788	2
Uzbekistan	10.5	12.2	17.4	23.3	36.6	26.9212	10
Kazakhstan	8.8	14.3	16.8	22.4	37.7	28.39032	13
Georgia	8.9	13.7	17.3	22	38.1	28.7073	14
Azerbaijan	9.3	11.9	17.7	22.1	39	30.05381	15
Lithuania	9.9	14.1	17.1	21.5	37.4	26.55661	8
Moldova	9.6	14.9	17.4	22.1	36	25.87432	4
Latvia	9.9	14.3	17.2	21.3	37.3	26.1603	5
Kyrghyzstan	9.3	13.3	18.8	21.8	36.8	27.13963	11
Tjikistan	11.9	11.9	16.9	23.3	36	25.67341	3
Armenia	9.7	14.3	17.6	22	36.4	26.44916	7
Turkmenistan	9.6	13	18.3	21.8	37.3	27.50055	12
Estonia	9.6	13.7	17.3	20.9	38.5	26.35545	6
USSR	8.8	13.9	17.7	22.2	37.4	28.22334	-

Table 21 Real Per Capita Aggregate Family Income and Welfare in USSR Republics in 1980 Ukrainian Prices

Republics	Per Capita Real Income					Welfare 1990	Rankings by Per Capita Real Income					Welfare Ranking 1990
	1980	1985	1987	1988	1990		1980	1985	1987	1988	1990	
Russia	148.7	154	157	159.6	172.2	126.2	13	13	12	12	12	12
Ukraine	123	135.6	138.3	139.3	159.6	121	9	9	9	9	9	11
Belarus	132.5	144.1	149.8	148	175.4	132.6	11	11	11	10	13	13
Uzbekistan	90.6	90.4	87.9	90	101.1	73.9	3	2	2	2	3	3
Kazakhstan	125.7	128.5	132.5	134.9	145.4	104.1	10	8	8	8	8	8
Georgia	118.9	139.8	149.8	156.7	161.2	114.9	8	10	10	11	10	9
Azerbaijan	86.5	96.1	100.8	103	98	68.5	2	3	3	3	2	2
Lithuania	148.7	152.6	159.9	165.4	161.2	118.4	12	12	13	13	11	10
Moldova	109.5	115.8	121	121.9	137.5	101.9	7	7	6	6	7	7
Latvia	166.3	170.9	178.6	178.5	207	152.8	14	14	14	14	14	14
Kyrghyzstan	94.6	98.9	100.8	104.5	116.9	85.2	4	4	4	5	5	5
Tjikistan	78.4	77.7	77.8	78.4	69.5	51.7	1	1	1	1	1	1
Armenia	108.1	115.8	123.9	124.8	134.3	98.8	6	6	7	7	6	6
Turkmenistan	98.7	100.3	103.7	103	102.7	74.5	5	5	5	4	4	4
Estonia	177.1	180.8	188.7	193	230.7	169.9	15	15	15	15	15	15
USSR	135.2	141.3	144.1	145.1	158	113.4	-	-	-	-	-	-

Table 22 presents the average growth rates of real per capita national income. The results suggest that a large number of republics suffered decreases in real per capita income between 1989 and 1990. As a matter of fact, the growth rate was negative in 14 out of 15 republics. Ukraine's per capita income grew quite strongly until 1989 but then the growth rate became negative in the subsequent year. Despite the fact that Ukraine's growth rate was negative, its ranking on the basis of its growth rate in 1990 was as high as 13. There was a large number of republics which suffered larger deterioration in their growth rates.

The poverty estimates of republics for the year 1990 are presented in Table 23. These estimates were obtained using the Ukrainian poverty lines discussed earlier. Again a general interpolation was used to compute these estimates. According to these results, 11.55 and 5.49 percent of people were poor and ultra poor in Ukraine, respectively. Ukraine's poverty ranking is 5th which means that there are only four other republics which had lower poverty than Ukraine. Among these four republics, three are Baltic republics viz, Estonia, Latvia and Lithuania. Belarus has the 4th ranking.

The republics which have the most severe poverty are Tajikistan, Uzbekistan, Azerbaijan and Turkmenistan. The percentage of the poor in these countries is more than 49. In Tajikistan, this percentage is as high as 67.97. Even the percentage of ultra poor is more than 52. This may be regarded as an extremely high level of poverty in a country which until recently was a part of the USSR, a leading power after World War II.

The conclusions about poverty in the republics must, however, be qualified. In our computations we have made the assumption that the price levels in different republics are the same. It is reasonable to assume that some differences in the price levels do exist but we still believe that our overall conclusion of extreme disparities in standard of living in different republics does hold.

Tables 24 and 25 indicate that the wage gap between rural workers (which include state and collective farmers) and blue and white collar workers has been continuously narrowing in the 1980s. This trend is evident in all the Soviet republics. Since the rural workers generally had the low average wages in the early 1980s, it means that income inequality in the republics must have significantly declined during the 1980s.

Table 22 Annual Growth Rates of Real Per Capita National Income for USSR Republics

Republics	Annual Growth Rates					Growth Rate 1985 to 1990	Rankings by Yearly Growth Rates					Avg Growth 1985 to 1990
	1986	1987	1988	1989	1990		1986	1987	1988	1989	1990	
Russia	1.02	-0.1	3.65	1.43	-5.44	0.112	11	6	6	8	6	7
Ukraine	1.01	4.84	2.07	3.69	-1.6	2.002	7	15	5	10	13	11
Belarus	1.04	2.99	1.78	7.27	-1.89	2.238	13	13	4	13	12	13
Uzbekistan	0.97	-2.47	6.86	0.4	-0.69	1.014	1	3	11	6	14	10
Kazakhstan	1	-1.2	4.55	-1.55	-2.45	0.07	5	5	8	5	9	6
Georgia	0.98	-2.65	6.08	-3.95	-4.53	-0.814	2	2	10	4	7	4
Azerbaijan	1	2.4	-0.88	-7.38	-8.93	-2.758	4	12	2	3	4	2
Lithuania	1.05	3.61	9.53	0.59	-13.56	0.244	14	14	14	7	1	8
Moldova	1.06	0.94	1.31	7.83	-7	0.828	15	10	3	15	5	9
Latvia	1.04	0.48	5.18	6.75	-3.33	2.024	12	8	9	12	8	12
Kyrghyzstan	0.99	0.71	10.64	2.45	-2.39	2.48	3	9	15	9	10	15
Tjikistan	1	-4.5	8.89	-10.47	-11.16	-3.248	6	1	13	1	2	1
Armenia	1.01	-1.59	-2.53	7.77	-10.77	-1.222	8	4	1	14	3	3
Turkmenistan	1.02	1.18	7.49	-9.05	-2.09	-0.29	10	11	12	2	11	5
Estonia	1.02	0.2	4.31	5.82	0.8	2.43	9	7	7	11	15	14
USSR	1.01	0.59	3.43	1.71	-4.57	0.434	-	-	-	-	-	-

Table 23 Poverty in USSR Republics in 1990

Republics	Poor				Ultra Poor			
	Head-Count Ratio		Poverty Gap Ratio		Head-Count Ratio		Poverty Gap Ratio	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Russia	11.62	6	2.46	6	5.86	6	1.16	6
Ukraine	11.55	5	2.29	5	5.49	5	1.01	5
Belarus	7.62	4	1.42	4	3.41	4	0.58	4
Uzbekistan	57.31	14	17.95	14	41.55	14	11.38	14
Kazakhstan	24.65	10	6.25	10	14.67	10	3.46	10
Georgia	17.93	8	4.3	9	10.13	9	2.28	9
Azerbaijan	49.61	13	15.59	13	36.08	13	9.91	13
Lithuania	5.87	3	1.11	3	2.66	3	0.46	3
Moldova	18.86	9	4.29	8	10.15	8	2.17	8
Latvia	4.86	2	0.88	2	2.13	2	0.35	2
Kyrghyzstan	46.75	11	13.69	11	31.83	11	8.36	11
Tjikistan	67.97	15	22.75	15	52.45	15	14.93	15
Armenia	16.95	7	3.83	7	9.06	7	1.92	7
Turkmenistan	49.44	12	14.69	12	34.13	12	9.04	12
Estonia	3.42	1	0.61	1	1.47	1	0.24	1
USSR	18.52	-	4.75	-	11.13	-	2.66	-

Table 24 Ratio of Average Salaries of State Farmers to Blue and White Collor Workers by USSR Republics

Republics	1980	1985	1986	1987	1988	1989	1990
Russia	88.4	100.1	103.8	103.7	100	101.5	105.4
Ukraine	87	93.2	97.2	98.1	96.9	99.3	107
Belarus	79.2	94.5	98.8	100.2	97	98.6	96.8
Uzbekistan	98.3	95.1	96.3	94.3	98.6	104.1	110.4
Kazakhstan	101.3	107.9	111.9	111.1	106.6	105.6	112.3
Georgia	73.4	79.1	81.9	78	79.4	79.8	91.7
Azerbaijan	93.8	98.7	87.3	79.6	76.2	76.5	84.4
Lithuania	82.5	99.8	101.6	100.8	96.1	99.4	98
Moldova	86.9	92.7	96.7	94.3	94.6	97.8	104.8
Latvia	90.8	113	65.3	111	103.9	104.4	96.5
Kyrghyzstan	83.7	93.1	91.2	89.4	88.5	91.4	90.6
Tjikistan	83.4	84.5	87	84.5	84.9	84.3	85.2
Armenia	75.3	79.7	81.1	77.7	79.9	75.6	76
Turkmenistan	94.8	95.1	96.7	99.8	103	116	118.5
Estonia	104.6	119.6	82	116.4	111.9	111.4	97.5
USSR	88.6	97	99.8	99.2	96.6	98.1	102.4

Table 25 Ratio of Average Salaries of Collective Farmers to Blue and White Collor Workers by USSR Republics

Republics	1980	1985	1986	1987	1988	1989	1990
Russia	69.9	82.4	86.4	87.5	85.2	85.6	89.3
Ukraine	66.8	78	82.8	84.4	83.8	84.7	88.7
Belarus	67.9	89.2	94.5	96.4	93	92.9	93.3
Uzbekistan	83.6	79.2	78.2	77.8	82.2	85.1	94.1
Kazakhstan	83.4	89.3	89.8	93.7	92.9	90	92.8
Georgia	76.2	86.9	82.2	78.5	77.6	85.9	109.1
Azerbaijan	111.3	127.7	115.5	103.1	99.4	101.9	123
Lithuania	80.7	96.5	101.1	101.4	100.6	105.4	106.8
Moldova	73.5	90.3	97.3	93.9	91.6	98	108.1
Latvia	88.6	108.6	110.6	110.5	107.1	105.7	103.3
Kyrghyzstan	79.5	98.5	90.5	93.6	90.1	100.3	100.5
Tjikistan	89.2	89.1	90.4	83.4	89.4	88.3	89.3
Armenia	84.6	98.2	97.4	93.6	94	93.2	113
Turkmenistan	86.4	84.7	75.9	81.4	86	92.1	100.9
Estonia	109.5	126.8	128.3	127.1	122.4	117.6	103.2
USSR	70.2	80.7	83.3	83.9	82.7	83.5	87.8

11. Concluding remarks

The average standard of living in Ukraine increased quite significantly in the late 1980s. The 1989-90 period registered an impressive growth rate of 7.4 percent in per capita family income but this was eroded in the subsequent periods from 1990 to 1992. Per capita family income declined by 23.56 percent during the 1991-92 period. Families largely dependent on government transfers suffered the greatest decline in their incomes. Their per capita income fell by 58.33 percent.

The significant increase in real per capita income in the 1980s was accompanied by a substantial decline in income inequality. Inequality declined monotonically from 1980 to 1991, but rose between 1991 to 1992. The results suggest that the families of state and collective farm workers improved their relative incomes (compared to industrial workers) between 1980 and 1991 which would have an equalizing effect on the distribution of income.

The inequality of total per capita income declined by 4.7 points between 1989 and 1991. The major cause of this reduction was the salary income of blue and white collar workers which contributed to a reduction of 3.9 points. Changes in collective farm income led to a reduction of 1.7 points in total inequality. Government transfers had no effect on inequality in the 1989-91 period. But in the subsequent period (1991-92), government transfers caused an increase in total inequality by 1.6 points. This increase came about mainly from the redistribution of government benefits in favor of richer families. The proposed progressivity index shows that government cash transfers became gradually less progressive during the 1989 to 1992 period. During a recession the government should target its scarce resources on the poor but in Ukraine exactly the opposite happened. The greater proposition of government transfers went to the richer families in 1992.

Poverty in Ukraine declined monotonically over the 1980-91 period. In 1980, 38 percent of the population were poor but this figure reduced to 8.76 percent in 1991. But in 1992 poverty increased to a massive figure of 29.75 percent. Of 20.99 percent increase in poverty, 17.13 percent was due to a decrease in per capita real income and the remaining 3.86 percent increase was due to the increase in income inequality.

Income inequality varied widely among the republics of the USSR. Inequality in Ukraine was found to be the lowest in 1990. Among the 15 republics, Ukraine's rank on the basis of per capita welfare was 11th. Ukraine's poverty ranking was 5th in 1990 which means that there were only four republics which had lower poverty than Ukraine. Some of the republics had poverty levels varying from 49 percent to 67.97 percent whereas the similar figure for Ukraine was only 11.55 percent.

Most of the analysis presented in the paper is confined to the period between 1980 and 1992. Ukraine performed reasonably well until 1991 and then the decline in the living standard began. Since January 1993, the real wages have been falling at a phenomenal rate. Table 26 supplied to us by the Statistical Department of Ukraine is a clear demonstration of rapidly falling standard of living in Ukraine between 1992 and 1993. The average per capita consumption of meat, fish and dairy products have fallen. Per capita consumption of these items among low income families is much lower than the norms of consumption worked out by the Institute of Hygiene.[13]

How long will the standard of living in Ukraine continue to fall? Nobody knows the answers. On the one hand, to control the hyperinflation, the government has to follow rigorous demand management policies and on the other hand it has to protect the poorest and most vulnerable groups in society. The task is gigantic, particularly when there exists no reliable information on which to formulate policies. The present paper provides a basis for determining the magnitude, causes and characteristics of inequality and poverty. This should help in designing appropriate policies but a lot more work needs to be done. And it needs to be done quickly.

[13]It might seem puzzling from Table 26 that consumption of vegetables and fruits increased by about 30% in the 1992-93 period while the real income collapsed substantially during the same period. This may be explained by the fact that many households grow vegetables and fruits in their plots which they can afford to eat even if they do not have large money incomes. In the paper, we noticed that the smallholding did increase in the 1991-92 period and this trend might have continued in 1993.

Table 26 Consumption of Foodstuffs by the Population of Ukraine (Kilos Per Year)

	1992		1993		
	Average per capita	Average per family member in low-income families	Average per capita	Per capita in low-income families	Norms of consumption worked out by the Institute of Hygiene and Nutrition (average per capita)
Meat and meat products	53.0	27.0	45.8	23.8	46.0
Milk and dairy products	286.0	203.0	246.0	172.0	350.7
Fish and fish products	8.5	4.5	6	3.2	13.9
Potatoes	131.0	73.0	136.0	100	90.2
Vegetables	92.0	50.0	138.0	70	106.9
Fruit and berries	38.0	25.0	50.0	26	61.1
Bread and bread products	143.0	75.0	143.0	100.0	94.0
Vegetable oil and margarine	10.8	4.8	7.5	3.6	7.4
Sugar and confectionary	45.0	19.0	44.0	19.0	26.8

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